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ANCIENT NOVAE AND SUPERNOVAE RECORDED IN THE ANNALS OF CHINA, KOREA, AND JAPAN AND THEIR SIGNIFICANCE IN RADIOASTRONOMY*

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ABSTRACT

In this paper is presented a new revised catalog of ancient novae, being a supplement and correction of a paper published in 1955. The first section describes the criteria of selecting the items which may be regarded as nova and gives the resulting list. Up to 1700 there are all together 90 items of novae observed in China, Korea and Japan. In comparison with the former paper only 53 items are retained in the table, and 37 items are newly added. In the second section are discussed 12 possible supernovae and their identification with 11 radio point sources. The third section deals with the spatial distribution of supernovae and it is found that the frequency of occurrence of supernova in the Milky Way is about one in every 50 years on the average.

I. ANCIENT NOVAE RECORDS

When a new star explodes, its brightness can increase several thousand to tens of thousand times in a few days, and when a supernova explodes, its brightness can increase hundreds of thousands to several million times. These phenomena, however, can barely be seen. /1**

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* This article was presented at the Peking Scientific Discussion Meeting of 1964, published in this Journal and the Science Journal at the same time. By the time of publication in this Journal, it had been revised to a certain extent.

** Note: Numbers in the margin indicate pagination in the original foreign text.

Since the appearance of Ophiuchu in 1604, no supernova has appeared in our galaxy for 360 years(1). About an average of 50 new stars appear each year, but not many are bright enough to be seen by the naked eye. There were five in the nineteenth century and sixteen in the first fifty years of the twentieth century (Ref. 1). Under these circumstances, in order to study the novae and supernovae, the astronomers have to resort to historical records of new stars. Even more than 110 years ago, a French scholar of Chinese classics, E. Biot, had already noticed that China is abundant in this material. Based on the data of Wên Hsien Thung Khao (Historical Investigation of Public Affairs) and Hsü Wên Hsien Thung Khao (Continuation of the Historical Investigation of Public Affairs), he put the strange stars in order (including new stars, comets, and even meteors), observed by the Chinese up to 1640, and published this in the French Astronomical Almanac of 1846 (Ref. 2). This drew the attention of the Europeans. After this, K. Houmboldt (Ref. 3) and E. Zinner (Ref. 4) of Germany, K. Lundmark of Sweden (Ref. 5) and Issei Yamamoto (Ref. 6) of Japan, respectively, compiled ancient star tables, based on this material and other scattered material. The material used by them is, however, not complete. For example, in Zinner's Table, the three supernovae that appeared in 1054, 1572, and 1604 are not listed at all. Also, Issei Yamamoto's table did not utilize the observational material of Japan itself.

The author compiled the "Ancient Novae Table" in 1955, based on the historical material of China and Japan, and listed 90 possible novae observed by the naked eye - the oldest starting from the records of the fourteenth century B. C., and the most recent extending up to 1700 (Ref.7).Since publication, this Table has been widely referred to by astronomers in every country. However, today - after nine years have passed - this Table also has its incompleteness and defects. First of all, the abundant Korean records are not included; in addition, some of the stars in the Table have already been found to actually be comets. In 1962, Ho Ping Yu of Malaya University also pointed out several errors (Ref. 8).

Considering that the record of ancient novae is still of some significance to future astronomical research, based upon widely collected material, we have recently re-examined and compared the related historical material of the three countries, China, Korea and Japan. Since technical terms used in ancient times are intermingled, it is very difficult to distinguish between the novae and the comets. Based upon modern astronomical knowledge, we have established a few criteria for distinguishing a new star:

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(1) The η-star which exploded in 1843 in Sagittarius, the 1928 new star of Centaur, and the new star of September, 1956,in the Ursa Minor are all regarded as possible supernovae. However, this has not yet been confirmed.

1. Any object that changes position or has a tail, no matter whether it is recorded as a guest star or a comet, is regarded as a comet and is not included.

2. Those objects which have direction only and no definite position - which generally means that they can be seen in the east before sunrise, and in the west after sunset - are too close to the sun, and the possibility of being a comet is great. Therefore, they are not included.

3. Those objects which are located far from the Milky Way and /2 are near the ecliptic are excluded.

4. Long stars, falling stars and candle-flame stars are excluded. These are only synonyms for a comet.

5. In case the name "Hui Hsing" is used in the record, after strict examination, it is generally excluded. However, when the name "Hsing po" is used, it is generally accepted - if it has a definite position. This is due to the fact that, in the "Chin Shu Astronomical Notes", the definitions are: 'Hui' - means, pointing in one direction; 'Po' - means, light shooting in all directions. The possibility of an object being a new star is greater in the case of "Po-Hsing" than it is in the case of "Hui Hsing".

6. When a conspicuous comet appears for a half-year, it should be carefully examined.

7. If the above six standards are fulfilled, the data for possible novae are compared with those 14,500 or more variable stars in the "Variable Star Table" (Ref. 9), published in 1958 to determine whether they pertain to other types of variable stars. If the answer is in the affirmative, they are not accepted.

After the above seven steps of examination have been taken, only 90 objects - out of nearly one thousand - can be regarded as novae. We have compiled a Table, which is attached to the end of this paper, to serve as a reference for those who work in the field of astronomy.

Compared with the "New Table of Ancient Novae", the present Table retains 53 of the original items, eliminating 37 of them (those in the annals having no definite positions, and those which are proved to be comets or variable stars; four objects were combined to make two objects), and 37 objects were newly added (among these, those of Korea comprise one-half). The following facts should be pointed out:

(1) Among the original 53 items, the information on some has increased;
(2) Among the newly-added 37 objects, there is one from Viet Nam, besides those of China and Korea;

(3) In order to complete the material, we have inserted, in chronological order, seven items of related material from Arabia and Europe, but re-numbered with Roman letters;

(4) Those which appear in the annals of the three countries, China, Korea and Japan, have a square bracket at the top of the Arabic numeral. There are four such cases.

II. SUPERNOVAE AND RADIO SOURCES (RADIO STARS)

Among these 90 items, the most interesting is the new star that appeared in the year 1054. In the year 1942, J. J. L. Duyvendak, N. U. Mayall, and J. H. Oort proved that it is the previous form of the Crab Nebula in Taurus (Ref. 10 - 12). Observations in the 1920s have shown that the Crab Nebula is continuously expanding at a speed of 1100 kilometers per second. Dividing the angle diameter (about 5') of this nebula by the angular speed of circumferential expansion, one can determine that this nebula started to expand from one point about one thousand years ago. At this same time, China and Japan recorded a guest star at the same position. Judging from the great speed of expansion of the Crab Nebula, this guest star must be a supernova. Chinese and Japanese astronomers found this supernova almost at the same time. It is recorded in greatest detail in China. The light variation curve, drawn according to these records, agrees with that of the supernova - which is the clearest case of a supernova up to the present - which appeared in 1938 in the star series NGC 4182. This provides adequate substantiation of the reliability of the ancient observations in the East.

After the invention of the radio telescope, it was found in 1949 that the Crab Nebula is a radio source (Ref. 13). It emits high-intensity radio waves. The wavelength ranges from 7.5 meters to 3.2 cm. The shorter the wavelength, the weaker is the radio intensity. If the variation curve of the radio intensity and light intensity of this nebula (with respect to frequency) are plotted on a chart, it can be seen that the two represent two sections of the same curve. This is a very impressive and interesting discovery. It shows that the light wave emitted by the Crab Nebula has the same origin as the radio wave. This is not the usual heat radiation due to high temperature of planets, but rather is an acceleration radiation which is generated when high-energy electrons are accelerated in a magnetic field (Ref. 14). Afterwards, at the position where, in 1572 and 1604, the supernova exploded, it was possible to take pictures of the nebula, and radio waves were also received (Ref. 15 - 16). Therefore, an important assumption was drawn: whenever a supernova explodes, a nebula is ejected and the nebula forms a radio source. The validity of this assumption, on one hand, must be tested by many more observations. On the other hand, the annals of ancient observations can provide some evidence and clues

as to its validity. In the latter respect, the ancient annals of the East can make significant contributions.

The supernova which appeared at Cassiopeia in 1572 is now called "Tycho supernova", because the Danish astronomer Tycho Brahe carefully /3 observed it. However, from the "Collection of Information on the Ming Dynasty", the "Ming Shi Lu", it can be seen that the star was found in China 3 days before Tycho discovered it, and was observed for two months longer. Our observational period extends from November 8, 1572 (3rd day, 10th month of Ming Rong Chin, 2nd year) to June, 1574 (Ming Wan Li, second year, 4th month). Tycho performed his observations from November 11, 1572, to March 15, 1574. Korea also recorded this supernova. It states in the "Actual Records of Emperor Shuan Chu" (Shuan Chu Su Lu): "In the 10th month of Shuan Chu, 5th year, a guest star appeared at the side of Cheh Hsing, which was larger than Venus".

The supernova which appeared at the Ophiuchus in 1604 is now called the Kepler supernova. Kepler, a German astronomer, has published the results of a twelve-month observation of this star. According to the "History of the Ming Dynasty" (Ming Shih), the Chinese found this star (October 10, 1604) only one day later than the Italian physician, whose name is unknown, and also performed observations for nearly one year (from October 10, 1604, until October 7, 1605), only two days less than the observational time in Europe. In Korea, although this star was found three or four days later than in Europe or China, it was observed punctually every night for more than five months. Its position and its light intensity were measured. When it rained, it was particularly noted that "no observations performed this night" (Ref. 17). The light variation curve is drawn according to the Chinese and Korean annals. For purposes of comparison, the curve drawn by Baade (Ref. 18) according to the European record is also plotted with a broken line on the same figure (Figure 1).

Apparently, there is a great difference between the two. According to the Korean record, the maximum occurred on October 28. It was as large as Venus and, according to the record of Kepler, it appeared on October 17, brighter than Jupiter. It appears that the Korean record is more reliable. On October 17, the record of Korea also states, "as big as Sui hsing (the Year star, Jupiter)", which agree with Kepler's observations. There is no observational record in Europe for the period between October 17 and January 3.

The above stars represent the three supernovae in the Milky Way which are publicly recognized. Based on the special features of these three supernovae, it seems possible to formulate the following two standards for the purpose of distinguishing the supernovae from the historical novae annals.

1. Brightness is especially great, and period of visibility is

especially long. The visibility periods of the above three supernovae are all greater than one year. The four brightest novae of the twentieth century, except for Herculis - the new star of 1934 - have visibility periods which are all less than one year. If a nova becomes as bright as Venus, then - before and after the change - it is already a star which can be seen by the naked eye and could be distinguished by the people of ancient ages.

2. If there is a radio source at the position where a nova explodes, and if the radio source has non-heat radiation properties, then this nova must be a supernova (Ref. 19).

These two conditions can be used to supplement each other. On the one hand, one can try to find a radio source at the position where the the first condition is fulfilled. On the other hand, one can try to find traces and records of a supernova where there is a radio source. We shall discuss below the relation between several possible novae and the radio source.

1. "In the 2nd year of the Chung-Phing period, in the tenth month, on a kuei-hai day, a guest-star appeared in the midst of the constellation Nan Mên (α, β Centaurus). It was as big as the half of a bamboo mat and showed five colors in turn, now brightening, now dimming. It diminished in brightness little by little, and finally disappeared in the 6th month of the following year." This section in the "Book of the Later Han Dynasty" (Hou Han Shu) may be the earliest record of a supernova in the world[1]. This supernova appeared, therefore, between the α and β-star of Centaurus about twenty months later. Its coordinate position in 1950 (positions used below are all converted to 1950) is:

$$\alpha = 14^h, \quad \delta = -60^\circ. \qquad /4$$

Considering its very large south celestial latitude and the fact that it is located so close to the horizon, it is very easy to understand the lines stating, "it showed five colors in turn". This is an optical phenomenon which occurs when a bright planet comes close to the horizon, blinking colorfully and intensely. The part which is hard to understand is the statement, " .... as big as a half of a mat." The mat referred to is a bamboo mat. When a star is as big as a bamboo mat, it seems to be a comet. However, it remained at the same position for twenty months. This fact rules out the possibility of its being a comet. It looks like the character "筵" is a misprint for "筵" . The latter is a type of bamboo rule used by the astronomers. It would be very natural for astronomers to use their tools to compare the size of stars. Considering that the tenth month of Hou Han is about the Autumn Equinox season, the constellation

(1) J. Needham of England felt that the record also pertained to a supernova and that it could be related to the radio star 2C1406 (Ref. 20). However, since there are still different explanations of the old inscriptions, we consider it more appropriate to start from this point.

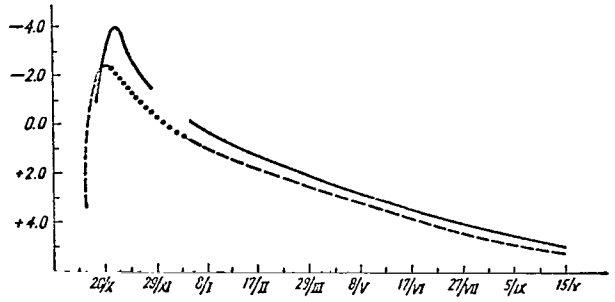

Figure 1

Light Variation Curve of the 1604 Nova of the Ophiuchus (Visible Star Rank)

The solid line represents the records of China and Korea. There were no records from November 27, 1604, to December 25, 1604, because the direction of the Nova was too close to the Sun and could not be observed. The broken line represents data by Baade according to European observational records. There were no European records from October 18, 1604, to January 2, 1605 (indicated by the dotted line in the figure).

Centaurus and the Sun almost set below the horizon at the same time. Therefore, this star should be visible in the daytime. Since it was so bright and did not move for a long period of time, it must have been a supernova. I. S. Shklovskiy assumes that the comparatively intense radio star ($\alpha = 13^h35^m$, $\delta = 60° 15'$) of the Centaurus was formed when this supernova exploded (Ref. 21).

2. In 1954, G. A. Shayn and I. S. Shklovskiy assumed that the nebula IC443 is the remainder of the great star which appeared below the Eastern Well (Tung Ching) in the third month of the second year, of the Pêng Chen period of the T'an Wên Tsung Reign in China. This nebula is also a radio source (Ref. 22 - 23). At that time the author thought that this guest star was not a nova, but a Halley Comet (Ref. 7). It is now considered to be a nova. There are two reasons for this. One reason is that on the 28th day of the 4th month, the object was at Leo, and moved to Gemini on the 29th day. It had moved 45° in one day, which is impossible. The second reason is that, according to the calculation of the orbital traces of the Halley Comet, its reverse rotation should occur at the end of the 4th month at Leo, not at Gemini.

However, if it is assumed that this nova is the previous form of IC443, a problem is still encountered, because the position of this nebula is between the η and μ-star of Gemini. However, according to the original, the nova is below Tung Ching, i.e., south of the ξ-star of Gemini, and these two positions are much too far apart. It is more reasonable to assume that the star referred to in the following statement

is the previous form of this nebula. The original says, "On the Jên Wu day of the first month in the third year of the Wei dynasty, Thai Yên reign period (February 26, 437), a star appeared in the east at Chen Chou (3-5 PM) at about the "Chin" position. It was reddish-yellow and as big as an orange". Since this star could be seen before 3 PM in the afternoon in the eastern sky, its visibility magnitude must be about -4^m. The distance of the nebula known now is 2,000 parsec distance. Taking the light absorption correction to be $1^m.5$ per 1,000 parsec distance, then the absolute stellar magnitude of this supernova at its maximum size is about -19^m, and is the largest among the supernovae.

On the other hand, the nova under the Eastern Well (Tung Ching) may correspond to another radio source CTB-21 (REf. 24). At the position of this radio source, there is a Rose nebula. Like IC443, it has a fine structure and may possibly be the remainder of a supernova.

3. In the "New Book of the Tang Dynasty" (Shin Tang Shu) and the "Investigation of Public Affairs" (Wên Hsien Thung Khao), it states: "On the Ping Sheng day of the fourth month in the first year (667 AD) of the Chong Tsang reign period, a comet appeared in the northeast, among the Five Chariots (Wu chhê), the Pleiades (Pi and Mao), and disappeared on the I-Hai day." In the "Old Book of the Tang Dynasty" (Chiu Tang Shu), and the "Important Records of the Tang Dynasty" (Tang Fei Yan), it states: "In the fourth month of the first year of the Chhong Tsang reign period (668 AD), a comet met the Five Chariots (Wu chhê), ... it belonged to the Po Hsing category, and was not very bright, ... disappeared on the twenty-second day." These two items actually were referring to the same thing. This is due to the fact that the Ping Shen day of the fourth month in the second year of the Chhen Fung reign period is the 26th day of the fourth month. I-Hai day is already May 15th, but not in the fourth month. And the Ping Shen day of the fourth month in the third year of the Chhen Fung reign period is the second day of the fourth month. I-Hai day is the 21st day, which differs by only one day from the record, which states: "disappeared on the 22nd day". The third year of Chhen Fung is the first year of Chhong Tsang. Based on this, the character "二" (two) in the Shin Tang Shu is a misprint for the character "三" (three).

With respect to the astronomical phenomenon, Korea also has two pieces of information. In the "Historical Records of Three Countries" (San Kuo Shu Chi), and the "Revised Edition of the Remarks on Public Affairs" (Cheng Pu Wên Hsien Khao), it states: "In the fourth month of the eighth year of Shin Ro Wên Wu Wang, a comet watches the Sky Ship." It also states: "In the fourth month of the summer of the 27th year of the Kao Kou Li Pao Tsang Wang reign period, a comet was seen between Ahn and Tsai." According to these four statements of the Chinese and Korean annals, especially noting the character "Sou" (to watch) in "San Kuo Shu Chi", it can be assumed that this is a nova, with a position

inside the longitudinal region of Tsai-Su star and Ahu-Su star, between the Five Chariots (Wu chhê)

$$\alpha = 4^h\ 30^m \qquad \delta = 45°.$$

Right at this position, there is a radio source CTB-13. Its position is

$$\alpha = 4^h\ 24^m, \quad \delta = 47°, \text{ Angle size} = 5° \times 2°.$$

R. W. Wilson and J. G. Bolton pointed out in 1960, based on the structural nature of the radio source, that it must be the remainder of the explosion of a supernova (Ref. 25). This is also our conclusion.

4. The statement, "On the Ping Wu day, the third month of the second year of Yung Shung reign, a comet appeared at the north of the "Five Chariots" (Wu Chhê) for twenty-five days, and disappeared on the Hsin Wei day of the fourth month" which is in "Hsin T'ang Shu" and "Chiou T'ang Shu", and also the statement "In the tenth month of the third year of Hsin Ro Shen Wên Wang reign period, a comet appeared at the "Five Chariots" (Wu Chhê) - which is in "San Kuo Shu Chi" - are possibly describing the same phenomenon. The Ping Wu day of the third month in the second year of Yung Shung reign to the Hsih Wei day of the fourth month correspond to April 20, to May 15, 684 A.D. Wu chê is the Charioteer (Auriga). After May 15, the sun gradually approaches the Charioteer, and therefore it cannot be seen. After a half year, the Charioteer can be seen in the east, in the latter half of the night. In October the width of its light variation curve is the largest, and this was observed by the Korean astronomers. Today, to the north of the Five Chariots (Wu chhê), there is a strong radio star, the Cart Driver A. /5

J. L. Steinberg and J. Lequex of France have pointed out, in the book "Radioastronomy" (Ref 26) which they wrote in 1960, that this radio star must be the remainder of a model II supernova. The light intensity of a model II supernova is relatively low when it is very bright, and the light variation curve has a maximum width (Ref 27).

5. In 1963, Yu. P. Pskovskiy connected CTA-1 with the supernova in the Chinese annals which exploded in the year 902. From CTA-1, estimating the distance from the diameter of a cellulose-like substance of the nebula (100-150 parsec distance), he found the stellar magnitude at maximum light intensity to be -8^m. According to the light variation curve of Cassiopeia B, the supernova CTA-1 can be seen for about two years. In China, the statement in the annals that, "In the first month of the second year of the Tieng Fu reign of the T'an dynasty (902 A.D.), a guest star which was like a peach, appeared beneath the Purple palace (Tzu Kung Fua Kai Hsing), ... disappeared the next year",agrees - in position, brightness, period of visibility, etc. - with the above conclusion. (Ref 28).

6. The Arabian historian of the thirteenth century, Barhebraeus, wrote in his Arabian "History of Dynasties" that, "In the 396th year of the Moslem calendar, a star as bright as Venus appeared. Its light shone in all directions, almost like the moon, and disappeared after four months" (Ref. 29). Prior to this, another Arabian historian Ibn al-Athir also wrote in his "General History" that, "On the 1st of the 8th month in the 396th year of his Moslem calendar, a very large star, which was extraordinarily bright, appeared at the left of Chipula of Iraq. It was like the moon and lasted until the 15th of the 11th month - for a total period of four months" (Ref. 30). The 396th year of the Moslem calendar corresponds to 1006 AD. Chipula of Iraq is located between Baghdad and Mecca. Considering the season in which the star appeared (May 3rd until August 13th of the Solar Calendar), Shonfeld concluded that this is the record of an explosion of a nova in the Scorpion. I. S. Shklovskiy assumed that this is a supernova, and also discussed several radio stars which may be related to it (Ref. 32). However, in the history books of China and Japan, there are detailed records of this star. According to these records, this star is not in the Scorpion or in the Lupus. It may represent the explosion of the Cavalry General star (the k-star of Lupus), because, in the "Record of the Full Moon" (Mei Getsu Ki) of Japan, it states: "The Cavalry General star changed and increased its light". In the edited manuscript of the "Important Records of the Sung Dynasty" (Sung Hwei Yao Chi Kao), it states, "A large star appeared to the east of the chamber, west of the Cavalier, measuring 3 degrees". The star at this position is also the Cavalry General star. The Cavalry General is now a double star. The light spectrum of the two component stars are B0 and A9, and the absolute stellar magnitude is $0^{m}.6$. Recently, it was found that many novae are double stars (Ref. 33). The spectrum of a nova after variation may also be B type or A type. Thus, the Cavalry General is probably a nova after variation, which can be seen by the naked eye. (The only one known up to the present).

7. In the Japanese "Mirror of My Wife" (Wagazuma Kagami), it states: "At the time of Hsii, on August 7, 1181, a guest star was seen in the east, as big as Saturn, and was bluish red. There is no other record of it after its appearance in 1006 AD, etc.". The Chinese "Book of the Sung Dynasty" (Sung Shu) and "Book of the Chin Dynasty" (Chin Shu) also recorded this guest star: "On the Chi Ssu day, the sixth month of the eighth year of the Siung Si reign of the Sung dynasty (the twenty-first year of the Ta-Ting reign of the Chin dynasty) (August 6th, 1181), a guest star appeared at Khuei Hsiu (constellation), invaded the Tzwan Shê star, and lasted for one-hundred and eighty-five days. It disappeared on the Kuei Yu day of the first month of the next year". This probably is the record of a supernova appearing at Cassiopeia.

8. "On the I-mao day of the 6th month, the 3rd year of the Cha Ta'i reign of the Sung dynasty (July 28, 1203), a star appeared in the southeast, at Wei-su; it was bluish white, without streaks of light. It was a guest star and as big as Saturn". This section of the description in the "Investigation of Public Affairs" (Wên Hsien Thung Khao) ruled out the possibility that a comet was recorded, and it can be regarded as a nova. Taking the

fact into account that light absorption is great in this area of the sky, the brightness of this star itself must be greater than it appears, and it is possible that this may be a supernova. At the present time, there is a radio source CTB-37 at this position. Its photo spectrum index is -0.3, and it is of the non-heat radiation type.

9. In Korea, three novae were recorded at the same time in the 25th /6 year of Lee Siuang Tsu (1592).

Among these three novae, one was near the θ-star of Cetus (the Whale), with very large celestial latitude (-70°). Its visibility period was more than fifteen months. The other two were both at the Cassiopeia. The one between the first and second stars (β and k-stars of Cassiopeia) was visible for nearly four months (November 30, 1592, until March 28, 1593) and could correspond to the radio star CTB-1. This is, therefore, no doubt a supernova also.

III. EXPLODING FREQUENCY OF SUPERNOVAE

In conclusion to the above study, the three countries - China, Korea and Japan - have recorded a total of twelve supernovae in their history. (There are probably more, but these must await verification by the radio-astronomers.) The star longitude l, star latitude b, stellar magnitude m, visibility period t, and distance r of the twelve supernovae are listed in the table on page 12.

When this table is compared with the 25 radio stars, which may be the remainder of supernovae, and which were listed by D. E. Harris in 1962, one finds that nine of them have corresponding radio sources. These are designated by H on the remarks column. This is a remarkable number. It is unfortunate that no material on the most intense radio source, Cassiopeia A, has been found. At present, it is generally assumed to be the remainder of the supernova which exploded in about 1700 (Ref. 35).

These twelve supernovae, along with the two possible[(1)] supernovae among the novae records of Arabic countries, comprise a total of fourteen supernovae which have been recorded within the Milky Way. There have been fourteen supernovae in two thousand years, comprising an average of one per 150 years. This is greater than the frequency of one in every 359 years for each star system which has been suggested by F. Zwicky (Ref. 36).

Based on the distribution of the celestial longitude of these fourteen /20 supernovae, as shown in Figure 2, there are more leading away from the celestial center than there are leading towards the celestial center. This is very strange, and is probably due to the following reasons:

(1) That portion of the Milky Way with a large south celestial

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(1) [1]The nova of Aquila, observed by the Romans in 389: l = 14°, b = -4°, t = 21 days, m = $3^{m}5$.

[2]The nova of Scorpion observed by the Arabs in 827: l = 322°, b = +5°, t = 4 months, m = -10^{m}.

No.	Supernova	Observer	Year	Remainder	Radio Source	l	b	t	m	r Parsec Distance	Remarks
1	Centaur B	China	185		13S6A	282°	0°	20 Months			H
2	Nova at Gemini	China	437	IC443	06N2A	162	+9		-4	2000	H
3	Nova at Perseus	China, Korea	668	Cellulose substance observed	CTB-13	127	0	19 Days			H
4	Charioteer A	China, Korea	683		04N4A	130	+4	25 Days		1900	H
5	Nova of the Camelopardalis	China	837	Rose nebula	CTB-21	74	0	23 Days			
6	Nova of the Cassiopeia	China	902	Dark optical emission arch	CTA-1	87	+10	2 Years	-8	150	H
7	Nova of the Taurus	China, Japan	1054	Crab nebula	05N2A	155	-3	22 Months	-5	1100	H
8	Nova of the Cassiopeia	China, Japan	1181		?	94	+3	185 Days	+1	(2300)	
9	Scorpion nova	China	1203	Sharpless 51?	CTB-37	304	-1		+1	(2300)	
10	Cassiopeia B	China, Korea, Europe	1572	Observed	00N6A	90	-2	18 Months	-4	360	H
11	Nova of the Cassiopeia	Korea	1592	Cellulose substance observed	CTB-1	86	0	118 Days			H
12	Nova of the Serpens	China, Korea, Europe	1604	Observed	CTB-41	332	+5	12 Months	-4	1000	H

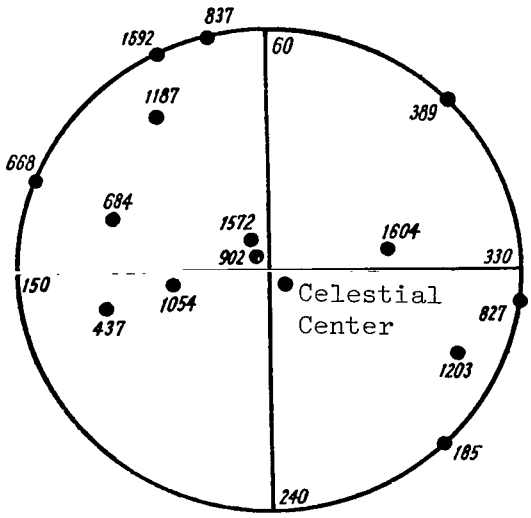

Figure 2

Distribution of Supernovae on the Stellar Coordinates

latitude (celestial longitude from 240° to 300°) cannot be seen from the three countries - China, Korea and Japan.

(2) Those supernovae observed by ancient people are all relatively close to us. If a supernova explodes at a distance of 10,000 sec. from us, under the condition of no star light absorption - assuming that its maximum absolute stellar magnitude $M = -16^m$ - then the visible stellar magnitude $m = -1^m$. This would be a star as bright as the Lupus (Wolf), and would be very apparent. If the corrected value for star light absorption is $1^m.5$ per one thousand parsec distance, then under the same condition, $m = +14^m$. It could then only be seen with a telescope of more than 25 cm diameter. If the distance is 5000 parsec distance, then under the latter condition, $m = +5^m$, it would then be barely apparent to the naked eye.

Let us now assume that the maximum distance r' of a supernova which can be seen by the naked eye is 5000 sec. Then the maximum distance from the center of the Milky Way to the region where a supernova can explode is r = 9000 sec. Due to the fact that the celestial latitudes of supernovae are all small, we can discuss the problem on a plane circle. Therefore, the ratio of frequency of supernovae explosion within our galaxy f, and the frequency of explosion within the visible region f' is

$$f : f' = \pi r^2 : \pi r'^2$$

$$f = \left(\frac{r}{r'}\right)^2 \times f' = \left(\frac{9}{5}\right)^2 \times \frac{1}{150} = \frac{1}{50} \text{ times/year}$$

This number is probably accurate. I. S. Shklovskiy and E. Opik (Ref. 37) both assume that, in the Milky Way system, probably one supernova

explodes every 30 years, on the average. During the first sixty years of the Twentieth Century, three supernovae exploded, respectively, in the Circinus system NGC 3184, 4321, and 6946. Recent results seem to point to the following: the explosion frequency is related to the mass and size of the star system. Large star systems, such as our Milky Way, must have a very large frequency of explosion (Ref. 35).

In conclusion, it should be pointed out that the calculation of the explosion frequency f of supernovae is of very great significance in three areas. First, in radio astronomy, the number N of radio stars in the Milky Way with a lifetime of less than T satisfies $N = T \times f$. If f is known, N can be estimated (Ref. 32). Secondly, it is related to the problem of the origin of cosmic rays in nuclear physics. According to the theory of light emission of the Crab nebula and the study of the stellar magnetic field, it is now generally assumed that supernova explosions represent the origin of cosmic rays. Thirdly, it is related to the evolution of celestial bodies. The question of whether the evolution of a planet must pass through the stage of a supernova explosion can be studied, on one hand, by investigating the physical properties of the planet. On the other hand, it can be studied by comparing the frequency of supernova explosions and the rate with which a planet in the Milky Way becomes a dwarf star. According to numerous calculations, during the past 50 million years 0.006 stars become dwarf stars, on the average (Ref. 40). If we assume that the frequency of supernova explosions is once in every 50 years, then during the past 50 million years, in every cubic parsec distance, there is only .0001 supernova which has exploded. This is only 1.7% of the previous number. Based on the above, it appears that not all of the planets pass through the stage of explosion to become a dwarf star, but only a small number of them.

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REVISED NEW TABLE OF ANCIENT NOVAE[1]

/7

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
1	On the 7th of the month on Chi-ssu day, a great new star appeared in company with Antares. On the Hsin-wei day, the new star faded.	Inscriptions on oracle remains	About 14th Century B.C.	Near α-star of Scorpion	16^h, 30^m	-25°	321°	$+13^\circ$			1	J. Needham believes the two records refer to the same star.
2	In spring of the 13th year of Ching Wang reign of the Chou dynasty, a star appeared at Andromeda.	Chu Shu Chi Nên	532 B.C.	Aquarius 3.5, μ,ε-star							6	
3	In the 7th month of the 3rd year of the Kaoh Ti reign of the Han dynasty, a star appeared at Arcturus, α-Bootes, and disappeared after about 10 days.	Han Shu, Wên Hsien, Thung Khao	134 B.C.	Arcturus, near the α-star	14-15	+20	346	+66			23	Probably explosion of AB-star of Bootes
[4]	A guest star was seen at Fang, the 6th month, 1st year of Yuen Kwang reign of Han dynasty.	Han Shu	134 B.C.	β,δ,π,ρ-stars of Scorpion					(1)	1	40	Ipaku also observed this.

(1) In this table, a bracket enclosing the number in the first column indicates that the record also appears in the West. When there is a star, this indicates that it is not included in the "New Table of Ancient Novae" (unrevised). L in the 10th column means that the number appears in Lundmark's table. "Yama" in the 11th column indicates that the number appears in Yamamoto Seiichi's table. "Ho" in column 12 means that the number appears in Ho-ping Wên's table. In the 3rd column, whenever the literature of Japan or Korea is first quoted, the words "Korea" or "Japan" are placed after the name of the book.

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
5*	A star appeared at Ho Hsu during Yuen Fung reign of the Han dynasty.	Han Shu	108-107 BC	Gemini							45	
6	The 9th month of the 4th year of Yuen Fung reign of the Han dynasty, a guest star appeared at the Purple Palace between the two poles, Tou and Shu.	Han Shu	77 BC	Between the α-star of Ursa Major & the North Pole	11 45	+72	98	+50	(2)	2	50	
7	The 4th month of the 1st year of Chu Yuen reign of the Han dynasty, a guest star as big as a melon appeared. It was bluish-white and was about 4 feet east of the 2nd star of Nan Tou.	Han Shu	48 BC	East of the τ-star of Centaurus	18 20	-25	335	-7	(4)	3	57	According to research of Shigeru Kanda, the 2nd star of Nan Tou is the τ-star of Centaurus
8	The 2nd month of the 2nd year of Chien Ping reign of the Han dynasty. A comet appeared at Bootes for more than 70 days.	Han Shu	5 BC	α,β,ε,ρ,π,ο - stars of Hydrus							63	
9*	On Chi You day, the 2nd month, spring of the 54th year of Shin Ro Su Tzu, a star appeared at Ho Ku.	San-Kuo Shi Chi (Korea)	4 BC	α,β,γ-stars of Aquila	19 50	+10	17	-10			64	Probably the explosion of Nova V500 of Aquila

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	The 3rd year of Chien-Ping reign of the Han dynasty, a star appeared at Ho Ku.	Han Shu										
10	In the 5th year of Chen Wu reign period during the later Han dynasty, a guest star invaded the Emperor constellation.	Hou Han Shu Yên Kwan Tzwan	29 AD	The vicinity of the α-star of Hercules	17 20						67	Probably a regenerated nova
11*	On the I-ssu day, the 4th month, 9th year of Pai-chi chi-Rou Wang, a guest star entered the Tzu Wei (Circumpolar Enclosure). In the 4th month of the 6th year of Shin-Ro Po-sa Wang, a guest star entered the Tzu-Wei. On the I-ssu day of the 4th month, the 2nd year of Yuen Ho reign period of Hou-Han dynasty, a guest star entered Tzu Kung.	San Kuo Shi Chi San Kuo Shi Chi Hou Han Shu Chang Ti Pên Chi	6/1 85 AD	Constant Brightness Region							86	
12	On the Wu shen day, the 8th month in the autumn of the 1st year of Yung-ch hu reign period, Hou Han dynasty, a star	Thung Chi Tzai Siang Roe, Tung Han Hwei Yao	9/13 107 AD	Southwest of the Canis Major k-star and the π-star of Puppis	7^h	-35°	214°	-12°	(9) 6		90	/8

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks /8
	appeared in the southwest of the Eastern Well (Tung chin).											
13	In the 11th month, the winter of the 4th year in the Yen Kwan reign period, Hou Han dynasty, a guest star was seen at the Ten Shu (Sky market).	Thung Chi, Wên Hsien Thung Khao, Hou Han Shu, Tung Han Hwei Yao	12/13 125 AD- 1/11 126 AD	Ophiuchus, Hercules, Serpens, Aquila, etc.	15 35 -19	-15 -+30				7	94	
14*	In the 2nd month, the spring of the 13th year of Kao Kou Ri Chu Ta Wang region period, a star appeared at Pei Tou.	San Kuo Shi Chi, Tzun Pu Wên Hsien Peh Khao (Korea)	3/18- 4/15 158 AD	Ursa Major	11-14	50-60					104	
15	In the 2nd year of the Chung-phing reign period, in the 10th month, on a Kuei-hai day, a guest star appeared in the midst of the constellation Nan Mên, as big as half a bamboo mat, and showed five colors in turn, now brightening, now dimming. It diminished in brightness little by little	Hou-Han Shu, Wên Hsien Thung Khao	12/7 185 AD to 7/28- 8/21 187 AD	Between α,β-stars of the Centaurus	14 20	-60	282	0	(12)	8	109	Supernova, radio star

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	and finally disappeared in the 6th month of the following year.											
16*	On the Hsin Hai day, the 10th month of the 5th year of Chien An reign period, Hou Han dynasty, a star appeared at Ta Liang.	Hou-han Shu, Thung Chien Wang Mu, Wên Hsien Thung Khao, Tung Han Hwei Yao	11/6 200 AD		3-5						115	
17*	On the Hsin mao day, the 10th month in the 12th year of Chien An reign period, Hou Han dynasty, a star appeared at Bird's Tail.	Same as above	11/10 207 AD		10.5-13						119	
18*	The 12th month, 17th year of Chien An reign period of Hou Han dynasty, a star appeared at the Five Claws.	Same as above	1/ 213 AD	Near the θ,τ,l,ν,φ-stars of Gemini	7	30	155	+18			120	
19*	The 9th month of the 5th year of Thai Shi reign period of Chin dynasty, a star appeared at	Chin Shu, Sung Shu, Wên Hsien Thung Khao	10/13-11/10 269 AD	Constant Brightness Region							145	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	the Purple Palace (Tzu Kung).											
20*	The 12th month, 10th year of Thai Shu reign period of Chin dynasty, a star appeared at Tzeng.	Chin Shu, Sung Shu, Wên Hsien Thung Khao	1/14-2/12 275 AD	α,β,γ,δ-stars of Corvus							146	
21	The 4th month in the summer of the 1st year of Thai Hsi reign period, Chin dynasty, a guest star appeared at the Purple Palace (Tzu Kung).	Thung Chi, Wên Hsien Thung Khao	4/27-5/25 290 AD	Constant Brightness Region					(14)		155	
22	The 5th month, summer of the 1st year in Yung Hsin reign period of Chin dynasty, a guest star appeared with the Pi-shin.	Chin Shu, Thung Chi, Wên Hsien Thung Khao, Sung Shu	6/19-7/18 304 AD	λ,γ,δ,ε,θ,α-stars of Taurus					(16)	10	163	/9
23*	In the 7th month, the 4th year of Sien Ho reign period of Chin Chêng Ti, a star appeared in the north west, invaded Tou, and diminished on the 23rd day.	Chin Shu, Sung Shu, Wên Hsien Thung Khao	8/11-9/9 329 AD	Ursa Major	11^h-14^m	50°-60°					167	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
24	In the 2nd month, the spring of the 4th year of Thai Ho reign period of Chin dynasty, a guest star was seen in the Western Wall of the Purple Palace (Tzu Kung Hsi Yuan). In the 7th month, it disappeared.	Chin Shu, Thung Chi, Wên Hsien Thung Khao	3/24-4/22 to 8/19-9/17 369 AD	Near the α,k,λ-stars of Draco, star 24 of Ursa Major, star 43, α of the Lynx	3^h 10^m -14	+65 -+70				(17) 11	174	
25	In the 3rd month, the spring of the 11th year of Thai Yuan reign period of the Chin dynasty, a guest star appeared at Nan Tou (φ-Sagittarii) and disappeared in the 6th month.	Chin Shu, Thung Chi, Sung Shu, Wên Hsien Thung Khao	4/15-5/14 to 7/13-8/10 386 AD	In the vicinity of the μ,λ,φ,τ,σ,ξ-stars of the Centaurus						(18) 12	177	
I*	Cuspianus of Rome observed that a new star appeared at "Ho Ku Two", larger than Venus, and disappeared after 3 weeks.		389 AD	Near the α-star of Aquila	19 50	+10	14	-4		(19) 13		Supernova
26	In the 2nd month, the spring of the 18th year of Thai Yuan reign period, Chin dynasty.	Chin Shu, Thung Chi, Wên Hsien Thung Khao	2/27-3/28 to 10/22-11/19 393 AD	Among ε,μ, ξ,η,θ,l,k,ν, λ-stars of the Scorpion	17 20	-40	316	-4		(20) 14	179	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
27	In the first year of the Sen Jwei reign period, Wei dynasty, a big yellow star appeared between Mao and Pi for 50 days. In the 11th month, a yellow star was seen again.	Wei shu	396 AD	Among η,λ,γ- stars of Taurus	4	+20	141	-22			182	
28*	On the I-ssu day, the 6th month of the 1st year in the Sên Jwei reign period of the Wei dynasty, a star appeared to the south of Mao.	Wei shu	7/20 414 AD	South of the η and other stars of Taurus	3 40	+20	137	-25			187	
29*	On the Mao-su day, 1st month of the 1st year in the Yuen Si reign period of Chin, a star appeared at Thai Wei Si Fan.	Chin Shu, Wên Hsien Thung Khao San Kuo Shi Chi	2/17 419 AD	Near the δ,θ,l,σ,β- stars of Leo	11 10 -11 50	0- +20					192	
30	In the 12th month of the 5th year in Thai Chhang reign period of Wei dynasty, a guest star appeared at the I-hsiu (wings).	Wei Shu	1/20- 2/17 421 AD	The Crater, Serpens							194	/10

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
31	On the Jen Shen day, the 5th month of the 2nd year in the Thai Yen reign period of the Wei dynasty, a guest star appeared at the Fang Hsiu (Room).	Wei Shu	6/21 436 AD	β,δ,π,ρ-stars of the Scorpion							199	
32	On the Jen Wu day, the 1st month of the 3rd year in the Thai-yen reign period of the Wei dynasty, a star appeared in the north east, close to the Ching Hsiu (well), yellowish red, as big as an orange.	Wei Shu, Sung Shu	2/26 437 AD	μ,λ,ε,ξ-stars of Gemini	$6^h\ 40^m$	+20°	162°	+9°			200	Supernova, Radio Star
33	In the 1st month of the 4th year in the Yuen Shiang reign period of the Wei dynasty (the 7th year, in the Tah Tung reign period of Si-Wei dynasty), a guest star appeared at Tzu-Kung.	Wei Shu, Si Wei Shu	2/11-3/12 541 AD	Constant Brightness Region							222	
34	On I-ssu day, the 9th month of the 1st year in Pao Têng period, a guest star appeared at I-hsiu (wings).	Suei Shu, Thung Chi	9/26 561 AD	The Crater, Serpens						(21) 15	224	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
35	On a Ping Hsu day, the 4th month of the 7th year in the Thai Chien reign period of the Chen dynasty, a star appeared at Ta Chio (Arcturus, α Bootes).	Suei Shu, Thung Chi	4/27 575 AD	Near the α-star of Bootes	14 20	+20	346	+66			231	Probably the explosion of the AB Nova of Bootes
36	On a Cha Teu day, the 10th month in the 8th year of the Khai Hwang reign period of the Sui dynasty, a star appeared.	Suei Shu, Thung Chi, Wên Hsien Thung Kao	11/22 588 AD	ξ,α,β,π,o,ρ-stars of Capricornus							235	
37	In the 4th month of the 1st year in Tzong-Tsang reign period of the Tang dynasty, a star appeared at Wû-chhe (the five chariots)..., it belonged to the Po Hsing category and was not very bright,... diminished on the 22nd day.	Chiu Tang Shu, Tang Hwei Yao	5/18-6/6 668 AD	Perseus	4 30	+45	127	0			251	Supernova, Radio Star
	On the Ping Chhen day of the 4th month in the 3rd year of the Chen Fung reign period, Thang dynasty, a star appeared in the east, among Wû-chhe, Pi Hsiu and Mao Hsiu. It disappeared on the I-hai day.	Shin Tang Shu, Wên Hsien Thung Kao										

No	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	In the 4th month, the 8th year of Sin Lo Wên Wu Wang, a star appeared to accompany the Sky Ship. In the 4th month, the summer of the 27th year of Kao-Kon Li Pao Tzang Wan, a star appeared between Mao Hsiu and Pi-hsiu.	San Kuo Shi Chi, Tzeng Pu Wên Hsien Khao										
38	On the Ping Wu day, the 3rd month in the 2nd year of the Yung Shiun reign period of the Tang dynasty, a star appeared to the north of Wû-chhe (the five chariots) for 25 days, and disappeared on the Hsin Wei day of the 4th month.	Chiu Tang Shu, Shin-Tang Shu, Wên Hsien Thung Khao	4/20-5/15 683 AD	In the vicinity of α,β,θ,l-stars of Auriga and the β-star of Taurus	5 20	+50	128	+4	(23)		257	Supernova, Radio star
	In the 10th month of the 3rd year of Shin Lo Shen Wên Wang, a star appeared at the Wû-chhe (the five chariots).	San Kuo Shu Chi	10/25-11/23 683 AD									

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
39*	On the 7th day of the 7th month in the 2nd year of the Chhin Rong reign of the Tang dynasty, a star appeared between Wei Hsiu and Mao Hsiu.	Chiu Tang Shu, Shin Tang Shu, Wên Hsien Thung Khao, Tang Hwei Yao	7/28 708 AD	Among the 35, 39, 41-stars of Aries and the η-star of Taurus.	$3^h\ 10^m$	+25°	127°	-25°			262	/11
40*	On the 8th day, the 8th month in the 3rd year of the Chhin Rong reign of the Tang dynasty, a star appeared at Tzu Wei Yuan (Purple Forbidden Enclosure).	Chiu Tang Shu, Shin Tang Shu, Tang Hwei Yao, Wên Hsien Thung Khao	9/16 709 AD	Constant Brightness Region							263	
41	At Jen Shen Time on the 3rd day of the 7th month, the 6th year of Yo-Ro period of Japan, a guest star appeared at the side of Ko-Tao (Approach to the Hall) for about 5 days.	Japanese Historical Information on Astronomy (Japan) History of Great Japan (Japan) Important Records of One Generation (Japan) Continuation, Japanese Annals (Japan)	8/19 722 AD	The vicinity of 1,ε,δ,θ,ν, ο-stars of Cassiopeia	1 40	+60	97	-1			266	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
42	At the Chi Mao time, on the 24th day, the 1st month of the 2nd year of the Shinki period of Japan, a star appeared at Hwa-Kai.	Japanese Historical Information on Astronomy, History of Great Japan; Continuation, Japanese Annals	2/11 725 AD	In the vicinity of star 38 of Cassiopeia	1 30	+70	94	+8			267	
43*	On the Cha Chu day, the 6th month of the 18th year in the Kai Yuan reign of the Tang dynasty, a comet appeared at Wû Chhe (the five chariots). On the Kuei Yu day, a star appeared at Pi-Mao.	Shin Tang Shu	6/30-7/10 730 AD	Among Taurus, Perseus, and Auriga	4 20	+30	136	-12			268	
44	At Kêng Yin time, on the 2nd day, the 12th month of the 16th year in the Ten Pei period of Japan, a star appeared at the General.	Japanese Historical Information on Astronomy; Continuation, Japanese Annals; Records of Japan (Japan).	1/8 745 AD	γ,φ,ν-stars of Andromeda and β,γ-stars of Triangulum	1 30 -2 10	+33 -+51					271	
II	The Arabian poet Haly and Babylonian astronomer Albumazar observed a nova which appeared at the tail of Scorpion.	History of Astronomy	827 AD	Among the ε,μ,ξ,η,θ,l, k,ν,λ⁻stars of Scorpion	16 50 -17 40	-43 --33				(24) 17		Supernova

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	It was as bright as a half moon and did not disappear until after 4 months.											
45*	On the Cha Shen day, the 3rd month of the 2nd year in the Kai Chen reign of the Tang dynasty, a guest star appeared under Tung Chin (the Eastern Well). On Ping Wu day of the 4th month, the guest star under Tung Chin disappeared.	Shin Tang Shu, Wên Hsien Thung Khao	4/29 to 5/21 837 AD	South of μ,ξ,ε,λ-stars of Gemini. Inside Camelopardalis.			74	0			291	Supernova, radio star
46*	On Wu Tzu day, the 3rd month of the 2nd year in the Kai Cheng reign of the Tang dynasty, a guest star appeared inside Tuan Mên (side door) near Ping Hsing. On Kuei Yu day of the 5th month, the guest star inside Tuang Mên disappeared.	Shin Tang Shu, Wên Hsien Thung Khao	5/3 to 6/17 837 AD	The vicinity of ξ,ν,π,o-stars of Virgo	12^h	+5	245	+65			291	/12

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
47	At Inu Doki time, on the 25th day of the 1st month, the 19th year of the Teikan period of Japan (the 1st year of Yuan Chin reign), a guest star appeared at Pi (Wall) Hsiu, in the west.	History of Great Japan, Record of the Bright Moon (Japan), Japanese Historical Information on Astronomy.	2/11 877 AD	Between the α-star of Andromeda and γ-star of Pegasus.							307	
48*	In the 1st year of Chong Ho reign of the Tang dynasty, a strange star appeared at the Hsiu Yii Kuei (Ghost Vehicle).	Shin Tang Shu	881 AD	The stars γ,δ,θ,η of Cancer								
49	At I Mao Hei time, on the 29th day of the 3rd month, the 3rd year of Kan Pei period of Japan, a guest star appeared at the east side of Tung Hsien Hsing about an inch away.	Mei Getsu Ki, Nippon Ki Riyaku, Japanese Historical Information on Astronomy.	5/11 891 AD	East of the stars φ,×,ψ, ω of Ophiuchus.	16 40	-20	327	+15			313	
50	In the 1st month, 2nd year of the Ten Fu reign of the Tang dynasty, a guest star like a peach appeared under the	Shing Tang Shu, Wên Hsien Thung Khao	902-903 AD	Near the γ-star of Lynx and the 48, 49, 50-stars of Cassiopeia	1 30	+65	95	+3			320	Supernova, radio star

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	Hwa Kai Hsing of Tzu Kung (the Purple Palace). ... On Ting Mau Day ... the guest star did not move; on Chi-ssu Day, the guest star remained at Kung. It disappeared the next year.											
51	In the 5th month of the 1st year in Chen Hwa reign of the Lian dynasty, a guest star invaded the constellation of Ti (King).	Wu Tai Shû, Wên Hsien Thung Khao, Hsii Tang Shu	5/31-6/28 911 AD	The vicinity of the α-star of Hercules	17 20	+15	5	+24	(30)		324	Probably the second explosion of the nova of 29 AD
III*	The nova of Cassiopeia in 945 AD	Leoviticus	945 AD	Cassiopeia					(31)	21		
52*	In the summer of the 5th year, Chhin Tzong reign of Korea, a star appeared.	Cheng Pu Wên Hsien Peh Khao	5-8 980 AD	The vicinity of the α-star of Hercules	17 20	+15	5	+24				Probably the re-explosion of the nova of 29 AD
[53]	On the I-ssu Day of the 3rd month, the 3rd year in the Chhin Tê reign of the Sung dynasty, a guest star appeared in the southeast.	Sung Shu	4/3 1006 AD						(33)	22	356	Arabian astronomers also observed this.

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	On the Wu Yin Day of the 4th month, the 3rd year of Chhin Tê reign of the Sung dynasty, Chou Po Hsing appeared at the west of Nân Chhi Kwan. Its shape was like a half-moon, and it had light horns. It was so bright that various objects were visible. It passed to the east of Ku Rou, and in the 8th month entered the Tzu with the Ten Sha. It was seen again in the 11th month, and afterwards was seen in the mornings of the 11th month, in the southeast.	Sung Shu, Wên Hsien Thung Khao	From 5/6 1006 AD									
	In the 3rd year of Chhing Tê reign of the Sung dynasty, Su Ten Chen (Officer of Astronomical Works) said that on the night of the 2nd day of the previous 4th month, at an early hour, a big star was seen. It was yellow, appeared to the east of Ku Lou (the Stock Room), east of the Chhi Kwan (Cavalry Officer), and gradually became brighter. It	Sung Hwei Yao Chi Kao	5/1 1006 AD									/13

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	was observed 3 times at the Ti.											
	In Japan, during the Kan Ko period, after the Kuei Yu night of the 2nd day of the 4th month of the 3rd year, a big guest star appeared in the Chhi Kwan. It looked like Ying Huo (Intermittent Glitterer, Mars), glittering continuously in the south. It is said that the Cavalier General changed itself and increased its brightness.	Record of the Bright Moon (Japan)	From 5/1 1006 AD	k-star of the Wolf (Lupus)	15^h m	-50°	292°	+6°				A great deal of material is collected on this in "Japanese Historical Information on Astronomy".
54	On Ting Chhou Day of the 1st month, the 4th year of Ta Chung Siang Fu period of the Sung dynasty, a guest star was seen in front of the Nan Tou Kuei.	Sung Shu, Wên Hsien Thung Khao	2/8 1011 AD	The vicinity of ϕ,σ,τ,ξ-stars of Centaurus	19	-30	335	-18	(35)	23	358	
55*	On the Hsin Hai day of the 11th month, the 10th year of the Sên Chong period in Korea, a comet was seen among Chong Cheng, Chong Jen and Shu Rou.	History of Korea (Korea)	1/26 1020 AD	Ophiuchus	17	50	-5	350	+9		363	Probably the explosion of the regenerated star, the RS-star of Ophiuchus.

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
56*	On the Kên Shen Day of the 9th month, the 22nd year of the Sên Tzong period in Korea, a large star entered the Yu Kuei (the Ghost Vehicle).	Cheng Pu Wên Hsien Peh Khao (History of Korea)	10/4 1031 AD	Among the θ,η,γ,δ-stars of Cancer	8 40	+20	174	+35				Probably a regenerated nova.
57	After the 2nd third of the 4th month, the 2nd year in the Ten Ki period of Japan, at the time of Chhou, a guest star appeared three times at the Hsiu Tsui (Turtle). It was seen in the east, with Ten Kwan Hsing, as big as Jupiter.	Mei Getsu Ki, Ichi Dai Yoh Ki	Between 5/20-5/29 1054 AD	The vicinity of the ξ-star of Taurus	53 0	+20	154	-5	(36)	25	375	Supernova, Radio Star: Taurus A
	On the Chi Chhou day of the 5th month, the 1st year of the Chu Ho reign of the Sung dynasty, a guest star appeared SE of Ten Kwan, several inches away. It diminished a little after about a year.	Sung Shu, Ten Wen Chi	7/4 1054 AD									
	On the Hsin Wei Day of the 3rd month, the 1st year of the Cha Yu reign of the	Sung Shu, Jen Chung Pên Chi	Disappeared 4/6 1056 AD									

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	Sung dynasty, the Officer of Astronomical Affairs said that since the 5th month of the 1st year of Chu Ho period, a guest star had appeared at the SE with Ten Kwan, and had just disappeared.											
	The 3rd month of the 1st year in Cha Yu period, the Officer of Astronomical Affairs said a guest star had disappeared and that it was a forecast of a guest leaving. At first it appeared in the east, in the morning of the 5th month in the 1st year of Chu Ho. It appeared with Ten Kwan. In the daytime, it looked like Tai Pai (The Great White One, Venus) sending out light beams in all directions. Its color was reddish white and it was seen for about 23 days.	Sung Hwei Yau Chi Kao										
58	On the Ping Shen Day of the 8th month the 1st year of Sên Yun reign of the Lyau dynasty, a guest	Lyau Shu Tau Tzong Pên Chi,	9/11 1065 AD	Among Serpens, Antlia, and Pyxis	$9^h\ 20^m$	$-25°$	$223°$	$+19°$			379	/14

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	star invaded Ten Myau (The Sky Temple).											
	On the Imau Day of the 6th month, the 19th year of Wen Tzong of Korea, a guest star as big as a lamp was seen.	History of Korea	8/1 1065 AD									
59*	On the Ting Chhou Day of the 8th month, the 27th year of Wen Tzong reign of Korea, a guest star was seen at the south of the Hsiu Tung Pi (Eastern Wall).	History of Korea	10/9 1073 AD	South of the γ-star of Pegasus	0 10	+10	78	-52			383	
60*	On the Hsin Ssu Day of the 7th month, the 8th year of Jwei Tzong reign of Korea, a star appeared at Ying Shih (Encampment).	History of Korea	8/15 1113 AD	The vicinity of the α,β-stars of Pegasus	23						394	
61*	On the Chi Ssu Day of the 7th month, the 1st year of Jen Tzong reign of Korea, a star appeared at Pei Tou (Northern Dipper).	History of Korea	8/11 1123 AD	Ursa Major	11-14	50-60					395	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
62	In the 5th month of the 8th year in the Sau Hsin period of the Kau Tzung Emperor, of the Sung dynasty, a guest star watched the Hsiu Lou (Bond).	Sung Shu, Wên Hsien Thung Khao	6/9-7/8 1138 AD	The α,β,γ-stars of Aries					(38)	27	402	
63	On the Jen Shen Day of the 2nd month, the 9th year of Sau Hsin reign of the Sung dynasty, a guest star stayed at the Hsiu Khang (Neck).	Sung Shu, Wên Hsien Thung Khao	3/23 1139 AD	The φ,l,k, λ-stars of Virgo					(39)	28	404	
64	On the Hsin Chhou Day of the 7th month, the 2nd year in Hsiun Hsi reign of the Sung dynasty, a star appeared in the west, above the Seven Dukes outside Tzu Wei Yuan, as small as Mars. It disappeared on Ping Wu Day.	Sung Shu, Sung Shu Shin Pen, Wên Hsien Thung Khao	8/10 to 8/15 1175 AD	Among Bootes, Hercules, and Draco	16	+60	58	+44		29	413	
65	On the Chi Ssu Day of the 6th month, the 8th year in the Hsium Hsi reign of the Sung dynasty,	Sung Shu, Wên Hsien Thung Khao	8/6 1181 AD to 2/6 1182 AD	Cassiopeia	$1^h\ 30^m$	+65°	95°	+3°		29	415	/15

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	a guest star appeared at the Hsiu Khuei (Legs). It invaded the Tzwan Hse Heing, did not disappear until the Kuei Yu Day of the 1st month, the next year, i.e., for some 185 days.											
	On the Cha Heii day of the 6th month, the 21st year in the Tah Ting period of China, a guest star appeared at Hwa Kai for 156 days, and then disappeared.	Chin Shu, Hsii Wên Hsien Thung Khao										Supernovae were also recorded in the following Japanese books: "Fall of Ruby" (Gyoku Sha) and "Record of One Hundred Subjects" (Hyaka Ren Sho).
	At the Kên Wu Hsii time, the 25th day of the 6th month, the 5th year of Chi Sho period in Japan, a guest star was seen in the north, near the Wang Liang Hsing. It stayed with Tzwan Hse Hsing.	Mei Getsu Ki, Dai Nippon Shi										
	At the Kên Wu Hsii time, the 25th day of the 6th month, the 5th year of Chi-Sho period in Japan, a guest star was seen in the north, as big as the Chen Hsing	Wagazuma Kagami (Japan)										

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	(Saturn). It was bluish red and had light horns. There had been no other such appearance since that of the 3rd year of Khan Koh (1006 AD).											
66	On the I-mau Day of the 6th month, the 3rd year of the Cha Thai reign of the Sung dynasty, a guest star appeared in the southeast among the Hsiu Wei (Tail). It was bluish white, as big as Saturn. On the Cha Chu Day, it was near Hsiu Wei.	Sung Shu, Wên Hsien Thung Khao	7/28-8/6 1203 AD	The vicinity of the ε,μ,ξ, η,λ,θ,1,k,ν-stars of Scorpion	17	-40	314	-1	(40)	30	419	Supernova
67*	In the 12th month of the 7th year in the Kau Tzong reign of Korea, a star appeared at Pei-Tou (The Northern Dipper)	History of Korea	1 1221 AD	Ursa Major	11-14	50-60					424	
68	On the Ichhou Day of the 6th month, the 17th year in the Cha-Ting reign of the Sung dynasty, a guest star invaded the Hsiu Wei (Tail).	Sung Shu	7/11 1224 AD	The ε,μ,ξ, η,λ,θ,1,k, ν-stars of Scorpion						31	427	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
69	On the Ting Yu Day of the 11th month, the 3rd year in the Sau Ting reign of the Sung dynasty, a star appeared below the Thu-su Hsing of T'en Shu Yuan (Sky Market Enclosure). It disappeared on the Jen-wu day of the 2nd month, the next year.	Sung Shu, Sung Shu Shin Pen	12/15 1230 AD to 3/20 1231 AD	South of the 109 star of Hercules	18 20	+20	16	+13	(41)		428	
70	On the Kên Yin Day of the 7th month, the 4th year in the Cha Hsi reign of Sung, a guest star appeared at the Hsiu Wei (Tail).	Sung Shu, Hsii Wên Hsien Thung Khao	8/17 1240 AD	The ε,μ,ξ, η,λ,θ,l,k, ν-stars of Scorpion						32	433	
IV*	In 1245 AD, a nova was observed at Capricornus, as big as Venus, and red as fire. It disappeared after two months.	Stadeneis	1245 AD	Capricornus						33		/16
V*	The 1264 AD nova of Casseopeia (near Cepheus).	Leouticus	1264 AD	Cassiopeia					(42)	34		

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
71*	In the 10th month, the winter of the 8th year in Hong Wu reign of the Ming dynasty, a star appeared at Nan Tou (The Southern Dipper).	Kwan Tung Thung Chi	11/5-12/3 1375 AD	The μ,λ,φ,σ, τ,ξ-stars of Centaurus								
72	On the Ping Yin Day of the 2nd month, the 21st year in the Hong Wu reign of the Ming dynasty, a star, reddish yellow, appeared at the Hsiu Tung Pi (Eastern Wall).	Ming Shu, Kuo Chue, Ming Thung Chien	3/29 1388 AD	Between the γ-star of Pegasus and the α-star of Andromeda						(43)		482
73*	In the 8th month of the 13th year, the Yung Lo reign of the Ming dynasty, a star appeared at the Nan Tou (The Southern Dipper).	Ming Hwei Yau	9/3-10/2 1415 AD	The vicinity of the μ,λ,φ, σ,τ,ξ-stars of Centaurus.								494
74	On the eve of Cha Shen Day, the 8th month of the 5th year in the Shuen Tê reign of the Ming dynasty, a guest star was seen about a foot east of Nan Ho (Southern River).	Ming Shu Lu, Kuo Chue, Ming Shu, Hsii Wên Hsien Thung Khao	9/3 1430 AD	The vicinity of the α,β,γ-stars of Canis Minor	$7^h\ 30^m$	+5°	181°	+13°		(44)	53	500

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	It was bluish yellow. On the Kên Yin Day, a star was seen at the side of Nan Ho, as big as a bullet, bluish black. It disappeared in about 26 days.											
75*	On the I-chhou Day of the 2nd month, the 19th year of the Shu Tzong reign of the Lee dynasty, a great star was seen for about 14 days, between the second and third stars of the Hsiu Wei, near the third star about a half-foot away.	Record of Occurrences in the Lee dynasty	3/11 1437 AD	Between the μ,ξ-stars of Scorpion	16 55	-40	314	0			508	
76*	At the time of Sô, on the Cha-wu Day of the 3rd month, the 3rd year of Chin Thai reign in the Ming dynasty, a star appeared at the Hsiu Pi (Net).	Ming Shu, Ming Hwei Yau, Hsii Wên Hsien Thung Khao	3/21 1452 AD	The α,ε,δ, γ,λ-stars of Taurus							515	
77*	In the 2nd month, the spring of the 1st year of Li-Chin Tzong Kwan Hsun	"Complete History of the Great Viet Nam" (Viet Nam) (Ta	2/22-3/22 1460 AD	Crater, Serpens								

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	reign in Viet Nam, a star appeared at the Hsiu Yi (Wings).	Yue Shue Chi Chuen Shu)										
78*	In the 6th month of the Cha-Chin reign of the Ming dynasty, a star appeared at T'en Shu (Sky Market).	Ming Shu	7/13 to 8/10 1523 AD	Hercules, Ophiuchus, Serpens, Aquila and Sagitta	$15^h\ 35^m$ -19^h	$-15°$ $-+30°$					543	/17
[79]	On Ping Chhen, the 3rd day of the 10th month, the 6th year of the Rong Chhin reign of the Ming dynasty, a guest star was seen in the NE as big as a bullet. It appeared at the side of Ko Tau at Pi Hsiu Tu and had a dim light. After 19 days, in the night of Jen Shen, its color was reddish yellow and was as big as a lamp, beaming in all directions. On the Cha Hsii Day, Lee Pu wrote to the emperor, "...since the 10th month, a guest star has been seen, with extra-ordinary brightness." This star started to	Ming Shu Lu	11/8 1572 AD- 4/21- 5/19 1574 AD	The vicinity of the 10 stars of Cassiopeia	0 10	+65	90°	-2°			565	Tycho nova. There are abridged records in the following: "Rules of the Country" (Kuo Chue); "General Investigations of the Ming Dynasty" (Ming Thung Ch'en); "Manuscript of Ming History" (Ming Shu Kau); "Story of Emperor Sen Tzong" (Sen Tzong Pên Chi); "Revised Edition of Remarks on Public Affairs" (Cheng Pu Wên Hsien Pei Khao); "Study of the Difference and Agreements of Star Records of China and the

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	diminish in the 2nd month of the 1st year in the Wan Li reign, and disappeared in the 4th month of the 2nd year.											West (Chung Shi Chin Hsing T'ong Yi).
	In the 10th month of the 5th year in the Suen Tzu reign of the Lee dynasty, a guest star appeared at the side of Chhe Hsing, bigger than Venus.	"Collection of Facts on the Lee Dynasty" (Lee Tsau Shu Ru), Suen Tzu Hsiu Cheng										
	A guest star appeared at the side of Chhe' Hsing. It appeared again in the 1st year of the Wan Li period, first large and then small.	Star Table. Part of the Astronomical Record in the Ming Dynasty (Ming Shu T'en Wên Chu Hsing Piau Pu Fun).										
80	From the Ting Wei Day to the Chi Yu Day of the 6th month, the 12th year in the Wan Li reign of the Ming dynasty, a star appeared at the Hsiu Fang (Room).	Kuo Chue, Ming Shu, Hsii Wên Hsien Thung Khao	7/9 to 7/11 1584 AD	β,δ,τ,ρ-stars of Scorpion					(48)	37	572	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
81*	From the Ping Wu Day of the 10th month, the 25th year of the Suen Tzu reign of the Lee dynasty to the Cha Shen Day of the 1st month of the 27th year, a guest star appeared at the east of the Ten He Hsing, withing three inches of the third star.	According to Lee Tsau Shu Ru	11/23 1592 AD to 2/24 1594 AD	South of the θ-star of Cetus	1 20	-10	120	-70		39	577	
82*	On the Kuei Chhou day of the 10th month, the 25th year in the Suen Tzu reign of the Lee dynasty, a guest star appeared to the east of Wang Liang, between the first and second stars, until it disappeared on the Hsin Hai Day of the 2nd month, the 26th year.	According to Lee Tsau Shu Ru	11/30 1592 AD to 3/28 1593 AD	Between the β and k-stars of the Cassiopeia	0 20	+62	88	0		38	577	Supernova, Radio Star
83*	On the Ting Ssu Day of the 11th month, the 25th year in the Suen Tzu reign of the Lee dynasty, a guest star was seen to the west of Wang Liang within the first star. It	According to Lee Tsau Shu Ru	12/4 1592 AD to 3/4 1593 AD	The vicinity of the β-star of Cassiopeia	$0^h\ 20^m$	+58°	88°	-4°			577	

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	disappeared after the Ting Hai Day of the 2nd month in the 26th year.											
VI*	In 1600, Jansen discovered the Swan P. After 2 years, Kepler regarded it as a third class star. It disappeared in 1621. In 1655, Casini found it again as a third class star.	The Galactic Novae	1600 - 1621 AD; seen again in 1655 AD.	Cygnus	20 14	+38	44	0				/18
84*	On Chi-ssu Day of the 11th month, the 33rd year of the Suen Tzu reign of the Lee dynasty, a guest star was seen at the Hsiu Wei (Tail), larger than Mars. It was yellowish red.	Cheng-Pu Wên Hsien Khao	12/14 1600 AD	The ε,μ,ξ, η,θ,l,k,ν, λ-stars of Scorpion							581	
[85]	I-chhou Day of the 9th month, the 32nd year in the Wan Li reign of the Ming dynasty, there was a star at Wei-Fun like a bullet. It was	Ming Shu, Hsii Wên Hsien Thung Khao	10/10 1604 AD to 10/7 1605 AD						(49)			Kepler nova. There is a detailed observational record in "Factual Record of the Lee Dynasty of Korea (Lee Tsau Shu Ru).

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	reddish yellow, facing the southwest, and disappeared in the 10th month. On the Hsin Yu Day of the 12th month, it turned and appeared in the southeast, still at Wei Fun. It became dimmer in the 2nd month of the next year and disappeared on the Ting Mau Day of the 8th month.											
	On the Wu Chhen Day of the 9th month, the 37th year in the Suen Tzu reign of the Lee dynasty, a guest star appeared at the Hsiu Wei (Tail). It was larger than the Tai Pai (Venus) and its color was yellowish red. It wandered about, and by the Kên Hsii Day of the 10th month had become smaller. On the Ping Chu Day of the 1st month, the 38th year (I-ssu), a guest star was seen on the T'en Chiang (Sky River), larger than Hsin Ho Hsing (Mars). Its color was a yellowish	Cheng Pu Wên Hsien Thung Khao	10/13 1604 AD to 5/2 1605 AD	North of the stars 44, θ, 36 of Ophiuchus	17 30	-21	334	+5				

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	red and it moved about. On the Chi-chhou Day of the 3rd month, it was very small.											
86*	In the 2nd month of the 23rd year in the Jen Tsu reign of the Lee dynasty, a large star entered the Hsiu Yu Kwei (Ghost Vehicle).	Cheng Pu Wên Hsien Thung Khao	2/26-3/27 1645 AD	Among the θ,η,γ,δ-stars of Cancer	8 40	+20	174	+35				
87*	On Wu Chhen Day of the 10th month (the 2nd one of the month), the 2nd year (Hsin Chhou) in the Hsien Tzong reign of the Lee dynasty, a guest star was seen at the Hsiu Nü (Girl), as large as Saturn. It disappeared on the Ting Hai Day of the 11th month.	Cheng Pu Wên Hsien Thung Khao	12/13 1661 AD to 1/1 1662 AD	The vicinity of the stars 3, 5, μ, ε of Aquarius								/19
88*	In the 9th month of the 5th year, Cha Chhen, in the Sên Tzong reign of the Lee dynasty, a guest star was seen at T'en Chiang (Sky River), as large as	Cheng Pu Wên Hsien Thung Khao	10/19-11/17 1664 AD to 6/13-7/12 1665 AD	North of the 44, θ, 36-stars of Ophiuchus	$17^h\ 30^m$	-21	334°	+5°				

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	Jupiter, yellowish red. It was then seen in the east, and disappeared in the 5th month of the next year.											
VII*	No. 11 star of Vulpecular (Little Fox) = Ck Vul. When discovered in 1669 by Anthelme, it was a third-class star. Afterwards, it became dimmer and disappeared. During April-May, 1671, it appeared as a third-class star again, and became a rank 6 star in 1672.	The Galactic Novae	12/20 1669 AD	Vulpecula	19 44	+27	31	0				
89	On Wu Tsu Day of the 1st month, the 15th year in the Khang Hsi reign of the Chin dynasty, a strange star was seen at the NE of T'en Wan. Its color was white.	Chin Shu Kau	2/18 1676 AD	Northeast of the γ,π, δ,ε,ξ-stars of Hydrus	4	-10	169	-40				
90	On the I-Yu Day of the 8th month, the 29th year in the Khan Hsi reign of	Chin Shu Kau	9/29 1690 AD	East of the ε-star of Centaurus	18 30	-34	327	-14				

No.	Original	Source of Material	Time	Constellation	α	β	l	b	L	Yama	Ho	Remarks
	the Chin dynasty, a strange star was seen at Sagittarius, the 7th). It was yellow and was seen for two nights. At the time of Hsii, on the 28th day, I-yu, of the 8th month, the 29th year in the Khan Hsi reign of the Chin dynasty, a strange star appeared to the east of the third star of Chi-Hsiu in the south. It was yellow and did not have a light tail. It was measured at Chhou Wei as 3°18' longitude and 34°,20' south latitude. On the 28th day, the guest star was still seen to the east of the third star of Chi Hsiu, yellow and without a light tail. Measuring equipment determined that the star had not moved.	According to the written records of Chin T'en Chen, which are kept at the Central Bureau of Records.										

TABLE SUPPLEMENT

Translation of Transliterated Chinese Titles

	Chinese Title	English
1.	Cheng Pu Wên Hsien Khao	Revised Edition of the Remarks on Public Affairs
2.	Cheng Pu Wên Hsien Thung Khao	Revised Edition of the Investigation of Public Affairs
3.	Chin Shu	The Book of the Chin Dynasty
4.	Chin Shu Kau	Manuscript of the History of the Chin Dynasty
5.	Chiu Tang Shu	Old Book of the Tang Dynasty
6.	Chu Shu Chi Nên	Bamboo Book of Year Record
7.	Dai Nippon Shi	History of the Great Japan
8.	Han Shu	Book of the Han Dynasty
9.	Hsii Tang Shu	Continuation of the Book of the Han Dynasty
10.	Hsii Wên Hsien Thung Khao	Continuation of the Investigation of Public Affairs
11.	Hou Han Shu Chang	Record of the Emperor Chang Ti in the Book of the Later Han Dynasty
12.	Hou Han Shu Yên Kwan Tzwan	The Story of Yên Kwan in the Book of the Later Han Dynasty
13.	Ichi Dai Yoh Ki	Important Record of One Generation
14.	Jen Chung Pên Chi	Record of the Emperor Jen Chung
15.	Kuo Chue	Rules of the Country
16.	Kwan Tung Thung Chi	General Record of Canton
17.	Lee Tsau Shu Ru	Factual Record of the Lee Dynasty
18.	Lyau Shu Tau Tzong Pên Chi	Story of the Emperor Tau Tzong in the History of the Lyau Dynasty

19.	Mei Getsu Ki	Record of the Bright Moon
20.	Ming Hwei Yau	Important Record of the Ming Dynasty
21.	Ming Shu	History of the Ming Dynasty
22.	Ming Shu Lu	Factual Record of the Ming Dynasty
23.	Ming Thung Chien	General Review of the Ming Dynasty
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